

Spaceborne lightning observations by means of VHF radiation

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Lightning Research Group of Osaka University (LRG-OU) has been developing VHF Broadband Digital Interferometer (DITF) to image precise lightning channels and monitor lightning activity widely. The feature of broadband DITF is its ultra-wide bandwidth (from 25MHz to 100MHz) and implicit redundancy for estimating VHF source location. LRG-OU considers an application of the broadband DITF to the spaceborne measurement system and joins the SOHLA (Space Oriented Higashi-Osaka Leading Associate) satellite project. The compactness and high-resolution are remarkable advantages to install a satellite. As a pilot study SOHLA is manufacturing a small satellite, SOHLA-1, with a corporation among Osaka Prefecture University and Japan Aerospace Exploration Agency (JAXA). LRG-OU takes responsibility for a mission of SOHLA-1. To examine the feasibility of the DITF receiving VHF lightning impulses in space, LRG-OU proposes the BMW (Broadband Measurement of Waveform for VHF Lightning Impulses). To finalize the specifications of the amplifier and analog-to-digital converter (ADC), numerical analysis for propagation characteristic of wideband EM wave in the ionosphere is done. Now BMW has been ready and the integrated system test of SOHLA-1 is on going.

From the successful satellite observation like TRMM/LIS, the effectiveness and impact of satellite observations for lightning are obvious. The combination of optical and VHF lightning observations are complimentary each other. ISS/JEM is a candidate platform to realize the simplest DITF and synchronous observations with optical sensors.